DIRECT TESTIMONY

OF

BUD GREEN

ENGINEERING DEPARTMENT

TELECOMMUNICATIONS DIVISION

ILLINOIS COMMERCE COMMISSION

ILLINOIS BELL TELEPHONE COMPANY

FILING TO INCREASE UNBUNDLED LOOP

AND NONRECURRING RATES

DOCKET NO. 02-0864

May 6, 2003

Q. Please state your name and business address.

A. My name is Bud Green and my business address is 527 East Capitol Avenue, Springfield, Illinois 62701.

Q. By whom are you employed and in what capacity?

A. I am employed by the Illinois Commerce Commission as the Chief Engineer in the Telecommunications Division and Manager overseeing the Engineering Department.

Q. Please briefly describe your work duties with the Illinois Commerce Commission.

A. My responsibilities include supervising and directing the activities of the Engineering Department of the Illinois Commerce Commission Telecommunications Division. These activities include certification cases, formal complaint cases, and various telecommunications industry related cases where engineering is warranted. I also plan, coordinate, and participate in telecommunications cases, provide expert testimony, and recommend Staff and Commission action within those proceedings. Finally, I furnish technical assistance on telecommunication matters for projects, studies, reports and research.

Q. Please state your educational background and work experience.

A. I am a Professional Engineer licensed in the State of Illinois. I graduated from the University of Illinois with a Bachelor of Science Degree in Engineering in 1970. After graduation, I joined Illinois Bell Telephone Company as an Engineer in its Engineering Department. While with Illinois Bell for 14 years I held the following positions: Engineer, Systems Analyst, Network Forecasting Engineer, Communications Systems Representative, Account Executive and Account Manager.

At divestiture in 1984, I transferred to AT&T as an Account Manager. In 1987, I joined Tele-Sav Inc, an inter-exchange carrier and held the following positions: IXC Traffic Trader, District Sales Manager and Director of Strategic Planning. As the Director of Strategic Planning I was responsible for the overall intermediate to long range planning for the IXC.

When Tele-Sav was sold to Telecom USA in July 1989, I returned to AT&T. Subsequent to my return to AT&T, I held the positions of Data Networking Account Executive, Sales Manager, and Building Engineer. In October 1998, I became the Vice President of a consulting engineering firm, KM2 Design Group, P.C. I joined the Illinois Commerce Commission in June 2000, as the Chief Telecommunications Engineer.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to address the issue of the appropriate fill factors to use in determining the rates of the unbundled network elements (UNEs) that are the subject of this proceeding. Specifically, I address the testimony of SBC Illinois (SBCI or the Company) witness Randall S. White (SBC Illinois Exhibit 8.0) with respect to fill factors. I also present my recommendation for the appropriate fill factors to use in setting UNE rates in this proceeding.

Q. Please describe the term fill factor.

A. Fill factor relates to the usable capacity of equipment or resources and is a component of both Long Run Service Incremental Cost (LRSIC) studies and Total Element Long Range Incremental Cost (TELRIC) studies. Usable capacity is defined in 83 Illinois Administrative Code Part 791 as "the maximum physical capacity of the equipment or resource less any capacity required for maintenance, testing, or administrative purposes." [1] By this definition, usable capacity includes spare capacity.

Q. Have you read the testimony of SBC Illinois witness Randall S. White?

A**.** Yes.

[1] 83 Ill. Admin. Code 791.20(n)

Q. Please summarize Mr. White's testimony.

A. Mr. White first describes the design of SBC Illinois' outside plant network. He also describes the SBCI Illinois network planning process and the role SBCI ascribes to spare capacity in an efficient forward looking network. He then advances arguments regarding how the fill factors which SBCI witness Mr. Smallwood uses are reasonable, and why they constitute a forward looking estimate. He further attempts to support certain other network related inputs that SBC seeks to use.

Q. Do you agree with Mr. White's description of the design of SBC Illinois' outside plant network, as described in lines 53 through 75 of his direct testimony, and Schedule RSW-1 attached to his direct testimony?

A. Yes. It appears to be an accurate description of SBC Illinois' current embedded network.

Q. Do you agree with how Mr. White defines "fill" as it relates to components of the network as described in lines 77 through 80 of his direct testimony?

A. Mr. White states that fill represents the extent to which embedded facilities are currently utilized to provide services to customers and that the portion of the facilities not currently in use constitutes "spare capacity". I do not concur with Mr. White's definition. Mr. White inappropriately defines the

term fill too narrowly by limiting it to current embedded utilization. The term "fill" can be used to refer to the utilization rate of a historical, current, or forward-looking network.

Q. Do the terms "fill" and "fill factor," mean the same thing?

A. No, they do not. The term "fill" defines the rate at which a network component is utilized (past, present, or future). The term "fill factor" is the number used to develop rates in a cost model. In the context of setting UNE rates, the "fill factor" is the number representing the fill rate of an efficient forward-looking network.

Q. Please give an example of how a fill or fill rate is determined.

A. Fill and fill rate are synonymous terms. The fill rate is determined by dividing the utilized resources by the total available resources. Using an example given by Mr. White, a 300 pair cable with 200 working pairs would have a 66.67% (200/300) fill rate.

Q. Would you expect the current embedded fill rates and the fill factors used in the determination of TELRIC-based UNE rates to be the same numbers?

A. No, I would not. Forward-looking fill factors reflective of an efficient network are necessary in determining appropriate UNE rates. In contrast, current embedded fill rates are reflective of either historical or current fills

and are not necessarily reflective of an efficient network. Thus, current embedded fills would be inappropriate to use as fill factors for determining UNE rates.

Q. Why should the fill factors used in setting UNE rates reflect the fill rate of an efficient, forward-looking network?

A. As Staff witness Jeffrey H. Hoagg discusses in his testimony, federal law defines the appropriate rates for UNEs as being developed using the TELRIC pricing methodology. And as Mr. Hoagg correctly notes: " In the TELRIC pricing methodology, reasonable fill factor estimates must, of course, be both forward-looking and reflect the operations of an efficient provider." [2]

Q. Mr. White contends on page 5 of his direct testimony that the fill levels SBCI used to develop its fill factors are consistent with an efficient, forward-looking network. Do you agree?

A. No, I do not. The fill levels he used appear to be current embedded fills. These current embedded fills, however, have not been demonstrated by Mr. White to be consistent with an efficient, forward-looking network.

[2] Staff Ex. 1.0 at 25

Q. Why are current embedded fills not necessarily consistent with the fills of an efficient, forward-looking network?

A. The reason that the use of current embedded fills is not necessarily consistent with an efficient, forward-looking network is that there is no evidence that the current fills are indicative of an efficient network today, let alone a forward-looking network. The current embedded network from which the current fills have been determined is a network that has evolved over decades. Thirty-five years ago, Outside Plant Engineers designed facilities with an adding machine, drafting board, and a slide rule. Today, sophisticated software assists engineers in determining outside plant design. The current embedded network contains facilities manually engineered long ago as well as facilities engineered today. Facilities engineered in the past did not include the consideration of the current or future demands for developing technologies. As a matter of fact, today's demands are causing the telecommunications carriers to redesign some of the existing plant. For instance, for services demanded today, telecommunications carriers are removing existing load coils and bridge taps that interfere with providing advanced services. These load coils and bridge taps were engineered in the past in response to conditions that no longer exist, but are nonetheless still prevalent in SBCI's current embedded network. Therefore, the type of efficient forward-looking network planning expected in a TELRIC study *could not be* planned using the planning tools and capabilities available to the engineers decades ago

who designed much of the embedded network. Consequently, SBCI's current embedded network does not reflect a forward-looking efficient network.

Q. What fill factor does Mr. White recommend in his testimony?

A. He contends the use of current embedded fills is the most reasonable projection of actual future utilization of each loop component.[3]

Q. Should the Commission permit SBCI to use current embedded fill factors as recommended by Mr. White?

A. No, it should not.

Q. Why should the Commission not permit SBCI to use current embedded fill as fill factors?

A. For two reasons. First, the use of current embedded fill to establish fill factors is inconsistent with the TELRIC methodology as discussed earlier. Specifically, SBCI has not demonstrated that its current embedded fill when used as a fill factor is consistent with an efficient forward looking network. Second, Mr. White contends that fills are fairly consistent over time and that current utilization levels are the best predictors of future utilization levels. Mr. White's position regarding the consistency of fills over time is directly contrary to the position SBCI witness William Palmer

[3] SBCI Ex. 8.0 at 24

179 took in Docket No. 96-0486/0569, the first SBCI Illinois TELRIC case.
180 There, Mr. Palmer testified that SBCI Illinois had in fact determined that
181 actual (that is, current embedded) fill factors vary over time as demand
182 shifts occur.[4] . I concur with Mr. Palmer that there are demand shifts over
183 time due to factors such as changes in population size, growth, density,
184 and changes in technology (e.g. growth in multiple residential lines for
185 internet, faxes, etc.). Therefore, in my opinion, Mr. Palmer's position is
186 more reasonable than that of Mr. White. Consequently, current embedded
187 fills cannot be used as predictors of an efficient, forward looking network
188 and Mr. White's confidence that fills are fairly consistent over time is
189 misplaced.
190
191 **Q. In spite of the fact that Mr. White's testimony contradicts that of Mr.**
192 **Palmer, does Mr. White demonstrate that the fill rates have been**
193 **fairly consistent over time?**
194 A. Not really. The evidence presented in Mr. White's Schedule RSW-10
195 displays current embedded fills over a 7-month period and Schedule
196 RSW-11displays current embedded fills over a 4-year period. These time
197 intervals are <u>far</u> too short to reasonably demonstrate the changes in fills of
198 SBCI's massive embedded network over time. By way of an analogy, this
199 would be akin to emptying some buckets of water into Lake Michigan over
200 seven months or four years and then taking water level measurements.

[4] Ameritech Illinois Ex 3.1,P.15 Docket No. 96-0486/96-0569 (consol.)

The resulting measurements would not be reflective of the changes in the lakes "fill" over time. Due to the great size of SBCI's embedded network, it would be reasonable to expect the fill rate of the current embedded network that has been built over decades not to change very rapidly over a relatively short period. Nonetheless, even if the fill rate were proven to be consistent over time, this embedded fill used as the fill factor would truly be backward looking. The size of SBCI's current embedded network masks any inefficient designs and renders the embedded fills a poor indicator for a forward-looking efficient network. The fill factor would be based on the embedded network that evolved from past practices, old technologies, past forecasts and past demands, hence backward-looking when we should be basing the fill factor on a forward-looking efficient network.

Q. Mr. White describes the SBCI network planning process. Please comment on his description and how it relates to fill rates.

A. Mr. White indicates that when SBCI plans to do a feeder "job" (i.e. install a feeder cable) the inputs to the job include the comparison of various technologies, the forecasted service demand, and a present worth analysis based on a 20-year horizon.[5] As we know, technologies change, forecasts are only best estimates that may not be borne out by actual events, and the accuracy of present worth analyses are affected by

[5] SBCI Ex. 8.0, at 7

interest rates that fluctuate over time. With all three of these inputs changing with time, an embedded network that may have been efficient when designed may no longer be an efficient network today and no longer forward-looking. Therefore, SBCI's current embedded network of various design factors would invariably have different fill rates from an efficient, forward-looking network totally designed today.

Q. Are there other reasons why the Commission should not permit the use of current embedded fill factors?

A. Yes. The company has been provisioning cables for decades and many of these older cables are still in use today. There are cables that were previously used to serve factories, businesses, and residential areas that are much smaller or no longer exist and, as a result, produce much less demand upon the network than before. The current embedded fill on these cables is, therefore, disproportionately low. On the other hand, there are also areas where the fill would be disproportionately high, such as in urban renewal areas that could not have been part of the original forecast. Either of these outcomes, of course, would be inconsistent with an efficient, forward-looking network.

Q. If there are problems with using current embedded fills for fill factors how should the Commission determine what fill factors are appropriate?

A. It is instructive to look back to previous UNE dockets and Commission Orders on fill factors to determine the appropriate fill factors and the manner through which they were determined. One such docket is, as noted above, 96-0486/96-0569. In that docket, Mr. Palmer of SBCI stated:

> …we determined not to use current actual fill factors, in part because these factors change over time with shifts in demand and, in addition, would result in higher costs than [sic] would be unacceptable in some cases. Instead, we developed and employed "target" fill factors – the optimal usage level above which point it is more cost effective to add plant and capacity rather than increase the utilization of the existing plant. These target fills realistically reflect efficient network use and are appropriate for the development of forward-looking economic costs.[6]

The Commission ruled as follows:

> We will adopt "target" fill factors as suggested by Mr. Palmer, because we agree with him that TELRIC – based prices are reasonably based on the "optimal usage level above which it is more cost effective to add plant and capacity rather than increase the utilization of the existing plant.[7]

The Commission further held that:

> We will use the target fills that Staff proposed. We note that Staff reviewed the same data relied upon by Ameritech Illinois to develop the targets. Furthermore, Staff used the same standard that Mr. Palmer proposed which we quoted above. Staff's analysis was essentially unrebutted. We believe that the change in methodology from usable capacity to target capacity will take

[6] Ameritech Illinois Ex 3.1,P.15 Docket No. 96-0486/96-0569 (consol.)
[7] *Second Interim Order* at 34, Investigation into forward looking cost studies and rates of Ameritech Illinois for interconnection, network elements, transport and termination of traffic, Docket No. 96-0486/0569 (February 17, 1998)(hereafter "Second Interim Order").

into account the emerging unbundled environment appropriately and adequately.[8]

Q. What were the target fill factor recommendations presented to the Commission by SBC Illinois witness Palmer and the Commission Staff in Dockets 96-0486/96-0569?

A.

Feeder	SBC IL	STAFF
Copper Aerial	75%	85%
Copper Buried	75%	85%
Copper U.G.	75%	85%
Fiber Aerial	33%	33%
Fiber Buried	33%	33%
Fiber U.G.	33%	33%
LS 2000 COT Eq.	75%	90%
LS 2000 RT Eq.	75%	90%
LS 2000 Ckt Cards	75%	90%
Distribution & Drop		
Copper Aerial	70%	80%
Copper Buried	70%	80%
Copper U.G.	70%	80%
Building	70%	80%
½ MDF & Prot.	90%	90%
Switch Ports	69%	95%
Multiplexing Eq.		
DS-1 to DS-3	95%	95%
DS-0 to DS-1	92%	92%[9]

[8] Id.
[9] ICC Staff Ex. 5.02 Attachment 1, Docket No. 96-0486/96-0569

Q. What fill factors do you recommend that the Commission allow?

A. I recommend that the Commission continue to use the fill factors it ordered for SBCI in Docket No. 96-0486/96-0569 in determining its UNE rates. Those fill factors are shown in the previous response under the column labeled "Staff."

Q. Do you have any reason to believe that the current fills of SBCI's network components are substantially different from the fills of the network components that existed during SBCI's last UNE rate case?

A. No, I do not. SBCI has not shown that the fills of its network components today are substantially different from the fills of its network at its last UNE rate case which was completed October 16, 2001, less than 2 years ago.[10] As I noted earlier, one would not expect significant fill changes in a massive embedded network such as SBCI's to be observed in a relatively short time period.

[10] *See, e.g.*, *Order*, Illinois Commerce Commission On Its Own Motion: Investigation into the compliance of Illinois Bell Telephone Company with the order in Docket 96-0486/0569 Consolidated regarding the filing of tariffs and the accompanying cost studies for interconnection, unbundled network elements and local transport and termination and regarding end to end bundling issues, ICC Docket No. 98-0396 (October 16, 2001) ("TELRIC II Order"); *Order on Reopening*, Investigation into the compliance of Illinois Bell Telephone Company with the order in Docket 96-0486/0569 Consolidated regarding the filing of tariffs and the accompanying cost studies for interconnection, unbundled network elements and local transport and termination and regarding end to end bundling issues, ICC Docket No. 98-0396 (April 30, 2002) ("TELRIC II Order on Reopening")

Q. Mr. White asserts that 12 Kft is a forward-looking crossover point from copper to DLC facilities. Please comment.

A. Although I agree with Mr. White that the loss in signal strength increases as the length of the copper facilities increase, I do not agree with his apparent conclusion that the additional signal loss associated with going from a 12 Kft crossover point to an 18 Kft crossover point requires the adoption of a 12 Kft crossover point from an engineering perspective. DSL (Digital Subscriber Line) services can be carried over 18 Kft of copper wire that has no load coils or bridge taps. Although the strength of the DSL signal may decrease for some customers when the crossover point is increased to 18kft, a sufficient DSL signal can still be carried at that distance.

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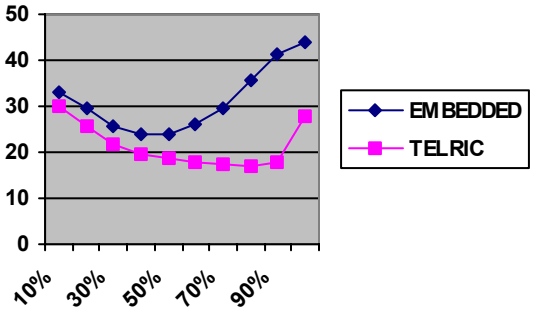
Q. Do you agree with Mr. White that maintenance and operating expenses increase as fill levels increase?

I agree with Mr. White that there is a relationship between maintenance and operating expenses and fill levels. However, Mr. White misstates the nature of this relationship because he models SBC's current embedded network (rather than an efficient network model as required under TELRIC). Specifically, the graph and table provided in Schedule RSW-4 (SBCI exhibit 8) are based on and derived from the current embedded network.

Cable fills are not the only determinants of higher operating costs at higher fills. Other aspects of SBCI's current embedded network, such as congested manholes or conduit routes, are just as significant in explaining increased operating costs at higher fill levels. To illustrate, consider for example Schedule RSW-3, which is a picture of an existing congested manhole. Working in these conditions is time consuming and increases costs and extends provisioning and service repair intervals. Operating expenses are higher in a congested situation because of lack of working space and space to place new plant. These increased expenses are not directly caused by the cable fill itself. Moreover, a factor like a congested manhole would increase the cost of maintaining all cables regardless of individual cable fills. In these congested situations even a cable with a low fill would have higher maintenance and operating costs.

An efficient forward-looking network would not contain these types of congestion and other inefficiencies that are embedded in SBCI's current network, and reflected in Mr. White's graph and table in Schedule RSW – 4. If we remove these compounding inefficiencies (as would be done in a TELRIC study) the relationship between operating expenses and fills appears more like the following:



This illustrates the general relationship that we would expect to see under TELRIC. It is not intended to be precise, as forward-looking TELRIC data was not provided.

Since TELRIC data was not provided, and there was no consideration for these compounding factors, the changes on operating costs associated with higher fill rates is unsubstantiated.

Q. Please summarize your findings and recommendations.

A. The Company's proposed fill factors which rely on current embedded fills are inappropriate to use as inputs in determining UNE loop rates because they have not been shown to be reflective of the fills of an efficient, forward-looking network. Moreover, SBC Illinois has not shown why the fill factors authorized by the Commission in SBCI's last UNE rate case are now inappropriate. Therefore, I recommend that the Commission reject SBCI's proposed fill factors and adopt my recommendation to use the fill factors this Commission adopted for SBCI in Docket No. 96-0486/96-0569.

Q. Does this conclude your testimony?

A. Yes it does.